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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/015,898	12/17/2001	Hiromi Nakanishi	33035M083	7345

441 7590 04/19/2005

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EXAMINER

PAYNE, DAVID C

ART UNIT	PAPER NUMBER
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2633

DATE MAILED: 04/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/015,898

Applicant(s)

NAKANISHI ET AL.

Examiner

David C. Payne

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 and 19 is/are rejected.
- 7) ☒ Claim(s) 18 and 20-23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/5/2002.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3, 5, 7, 14, 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsuda et al. US 6327407 B1 (Mitsuda) in view of Ozawa US 5960135 A (Ozawa) or Hauer et al. US 5696862 A (Hauer).

Re claims 1 or 2, Mitsuda disclosed An optical receiver comprising: (a) a substrate (e.g., col./line: 3/30-50); (b) a photodiode (PD) (16 of Figure 3a) placed on the substrate; (c) a light-transmitting medium that: (c1) is placed on the substrate; and (d) a wavelength-selecting filter (e.g., col./line: 14/40-50) that: (d1) is placed at the midpoint of the light-transmitting medium (17 of Figure 12) ; (d2) selects light having a specified wavelength out of light emerging from the light-transmitting medium; and (d3) transmits the selected light to the PD to enable the PD to detect it.

Mitsuda does not disclose that the multiwavelength light originates entirely from outside. Ozawa disclosed an optical module that filters multiwavelength light from outside the device (e.g., col./line: 6/1-10). Also Hauer disclosed a wavelength selective filter (Fi1 of Figure 1a) at the end of the fiber that filters multiwavelength light. It would have been obvious to one of ordinary skill in the art at the time of invention that multiwavelength light from the outside could be filtered in the Mitsuda reference as in the Ozawa reference given that the a WDM optical system will transmit multiwavelength light

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from more than one point in the network that will need to be filtered at an optical receiver.

Furthermore, while Mitsuda shows the filter at midpoint of the fiber, the function of a filter would not change if it were at the endpoint such as Hauer, since filtering of signals along a path had the same result and therefore obvious to one of ordinary skill to place the filter anywhere along the reception path.

Re claims 3 and 5, Mitsuda disclosed wherein the light-transmitting medium is an optical fiber, e.g., col./line: 3/30-50.

Re claim 7, Mitsuda disclosed wherein the wavelength-selecting filter is placed obliquely to the axis of the light-transmitting medium, see Figure 3a.

Re claim 14, Mitsuda disclosed wherein

(a) a groove is formed on the substrate to fix the optical fiber; and (b) an optical pathway-changing groove is formed on the substrate to reflect light having passed through the wavelength-selecting filter into the PD. (Mitsuda - 101a Figure 14)

Re claim 16, Mitsuda disclosed an oblique space with a filter inserted therein (Mitsuda 17 of Figure 12).

4. Claims 4, 6, 15, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsuda et al. US 6327407 B1 (Mitsuda) in view of Ozawa US 5960135 A (Ozawa) or Hauer et al. US 5696862 A (Hauer) as applied to claims 1 and 2 above and in further view of Takahashi US 6215917 B1 (Takahashi).

Re claims 4 and 6, the modified invention of Mitsuda and (Ozawa or Hauer) (hereinafter referred to as the Modified-1 invention) disclosed the aforementioned invention but does not disclose wherein the

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light-transmitting medium is an optical waveguide formed on the substrate. Takahashi disclosed a light-transmitting medium optical waveguide formed on a substrate (e.g., col./line: 8/9-20). It would have been obvious to one of ordinary skill in the art at the time of invention to form a substrate based waveguide rather than an optical fiber to enable assembly without having to align and insert or couple fiber to the optical receiver.

Re claim 15, the modified invention (Modified-1) disclosed wherein

(a) a groove is formed on the substrate to fix the optical fiber; and (b) an optical pathway-changing groove is formed on the substrate to reflect light having passed through the wavelength-selecting filter into the PD. (Mitsuda - 101a Figure 14)

Re claim 17, Mitsuda disclosed an oblique space with a filter inserted therein (Mitsuda 17 of Figure 12).

5. Claims 8 - 11, 13, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsuda et al. US 6327407 B1 (Mitsuda) in view of Ozawa US 5960135 A (Ozawa) or Hauer et al. US 5696862 A (Hauer) as applied to claims 1, 2 and 5 above and in further view of Okada et al. US 6567590 B1 (Okada).

Re claims 8, 9 and 10, the modified invention of Mitsuda and (Ozawa or Hauer) (hereinafter referred to as the Modified-2 invention) disclosed the silicon device invention but does not disclose a Silicon (Si) or ceramic substrate or a SiO₂ waveguide specifically. Okada disclosed the use of Silicon and Ceramic substrates (e.g., col./lines: 8/5-10). It would have been obvious to one of ordinary skill in the art at the time of invention to use Silicon and Ceramic substrates in the Modified-2 invention since ceramic or plastic substrates allow the path conversion groove to take an arbitrary shape with arbitrary slanting angles. The ceramic substrate is an insulator, which is convenient for insulating the parts electrically. On the other hand, the silicon single crystal substrate has an advantage of making the path conversion groove by anisotropic etching facilely. In the case of the ceramic substrate, the

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path conversion groove can be formed by mechanical dicing, see Okada e.g., col./lines: 12/35-50.

Similarly, Okada disclosed a SiO₂ waveguide, col./lines: 16/10-15, which is an equally common material for the matching of silicon substrates.

Re claim 11, the Modified-2 invention disclosed wherein the fiber groove area is covered with resin (Mitsuda - col./line: 3/35-40). However, it does not disclose wherein the PD, the wavelength-selecting filter, are covered with a transparent resin. Okada disclosed the use of resin to encapsulate other components such as a transmitter and PD (Figure 13). It would have been obvious to one of ordinary skill in the art at the time of invention that resin is useful for fixing and sealing all these elements to the substrate since a covering of resin over the area would cover all components in one step without the need of additional bonding steps and further work to seal out environmental hazards.

Re claims 13 and 19, the modified invention (Modified-2 invention) disclosed the aforementioned invention but does not disclose wherein an amplifier is provided on the substrate to amplify the photocurrent generated by the PD or the use of a ferrule on the optical fiber. Okada disclosed the use of a ferrule (74 of Figure 15) and amplifier (81 of Figure 15) connected to the PD. It would have been obvious to one of ordinary skill in the art at the time of invention to use a ferrule in the Modified-2 invention to secure the fiber end from breaking and an amplifier to magnify the received optical signals for further processing at levels compatible with electronic circuits.

6. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mitsuda et al. US 6327407 B1 (Mitsuda) in view of Ozawa US 5960135 A (Ozawa) or Hauer et al. US 5696862 A (Hauer) as applied to claims 1 and 2 above and in further view of Chua et al. US 5519526 A (Chua).

Re claim 12, the modified invention of Mitsuda and (Ozawa or Hauer) (hereinafter referred to as the Modified-3 invention) disclosed the aforementioned invention but does not disclose wherein the PD is a back-illuminated PD. Chua disclosed a back-illuminated PD (e.g., col./line: 19/5-10). It would have been obvious to one of ordinary skill in the art at the time of invention to use a back-illuminated PD in

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the Modified-3 invention since the detectors can detect data rates up to 60 GHz, as disclosed by Chua see previous citation.

Allowable Subject Matter

7. Claims 18, 20-23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

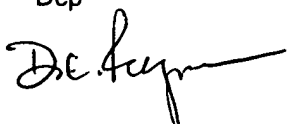
Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David C. Payne whose telephone number is (571) 272-3024. The examiner can normally be reached on M-F, 7a-4p.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dcp



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David C. Payne
Patent Examiner
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